

## THE NASA/JPL TOPOGRAPHIC SAR (TOPSAR) PROGRAM

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During the last few years, JPL has developed a C-band (5.67 wavelength) aircraft radar system that acquires interferometric maps of the earth. This is an adjunct to the NASA/JPL Aircraft Synthetic Aperture Radar (AIRSAR) system that acquires multi-polarization SAR images at P-band (70cm wavelength), at L-band (25cm wavelength) and at C-band. The TOPSAR/AIRSAR system routinely flies on the DC-8 Airborne Laboratory operated by the NASA Ames Research Center. This TOPSAR/AIRSAR system is implemented such that the C-band interferometry can be acquired simultaneously with the P-band and L-band polarimetry data.

The TOPSAR system is implemented via two antennas mounted vertically with a 2.6 meter spacing on the left side of the aircraft. Interferometric maps of the surface are constructed by comparing the phase differences between SAR images from the two antennas. Statistical elevation errors for the TOPSAR system range from 2.0 meters for flat land to 5.5 meters for mountainous areas. Typical data acquisitions are for areas of 10 km across-track (i.e. in range) and 40 to 50 km along track (i.e. in azimuth). However a recent observations of Isla Fernadina in the summer of 1993 demonstrated that these 10 km \* 50 KM topographic maps could be mosaicked together for an area of about 40km \* 4 Okm.

During the summer of 1993, we experimented with "repeat pass" interferometry in an attempt to acquire phase-coherent SAR images from two separate, but nearly identical, aircraft flight paths. Also, these aircraft observations are a precursor for a possible earth-orbiting Topographic SATellite (TOPSAT).